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An epitome

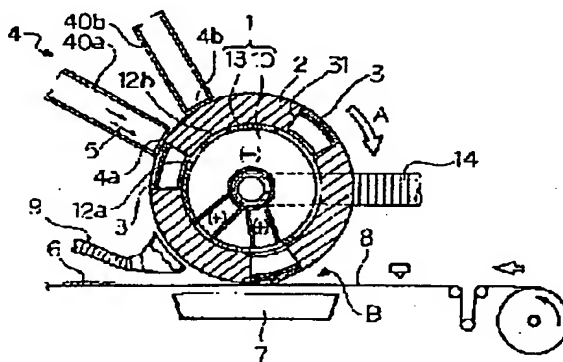
(57) [Abstract]

[Technical problem] Accumulate the dispersed raw material and offer the manufacture method of a Plastic solid and manufacturing installation which can manufacture continuously and efficiently the absorber suitable for health articles, such as an absorber of the manufacture method and manufacturing installation which can manufacture a Plastic solid continuously and efficiently, and the structure where contents, such as *** structure and absorption polymer, differ selectively further especially a disposable diaper, and a sanitary napkin.

[Means for Solution] Disperse a raw material 5, supply and this raw material 5 is

made to attract and deposit on each crevice 3 for accumulation, it is the manufacture method of a Plastic solid of manufacturing a Plastic solid, each above-mentioned crevice 3 for accumulation is divided into two or more unit accumulation sections which can be attracted mutual independently, and the above-mentioned raw material 5 is made to attract and deposit on this unit accumulation section by making a sediment of this raw material 5 release from mold from this crevice 3 for accumulation.

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CLAIMS

[Claim(s)]

[Claim 1] The manufacture method of the Plastic solid characterized by to disperse a raw material, to supply, to make this raw material attract and deposit on a crevice for accumulation, to divide the above-mentioned crevice for accumulation into two or more unit accumulation sections which can be attracted mutual independently, and to make the above-mentioned raw material attract and deposit for every unit

accumulation section of this in a method of manufacturing a Plastic solid by making a sediment of this raw material releasing from mold from this crevice for accumulation.

[Claim 2] A manufacture method of a Plastic solid according to claim 1 of making a raw material with which a class and an amount differ from a presentation depositing for every above-mentioned unit accumulation section.

[Claim 3] A fixed drum on which the interior is maintained by negative pressure, and a rotating drum which rotates along with a peripheral face of this fixed drum, and has two or more crevices for accumulation in a peripheral face, It has a feeding means to disperse a raw material in a peripheral face of this rotating drum, and to supply it to it. The supplied above-mentioned raw material is made to attract and deposit in each crevice for accumulation of the above-mentioned rotating drum. A manufacturing installation of a Plastic solid with which it is equipment which manufactures a Plastic solid continuously by making a sediment of this raw material release from mold from this each crevice for accumulation, and each above-mentioned crevice for accumulation is divided into two or more unit accumulation sections which can be attracted mutual independently.

[Claim 4] The above-mentioned feeding means is equipped with feeding opening which carries out a opening toward a peripheral face of the above-mentioned rotating drum. Attraction opening corresponding to each above-mentioned unit accumulation section is prepared in inner skin of the above-mentioned rotating drum. Inhalation opening corresponding to each above-mentioned feeding opening is prepared in a peripheral face of the above-mentioned fixed drum. In case the above-mentioned rotating drum rotates and each above-mentioned crevice for accumulation passes through each above-mentioned feeding opening front A manufacturing installation of a Plastic solid according to claim 3 currently made as [attract / the above-mentioned unit accumulation section which at least 1 of the above-mentioned attraction openings and inhalation opening of the above-mentioned fixed drum lapped, and was opened for free passage by this inhalation opening in each crevice for accumulation / selectively].

[Claim 5] The above-mentioned feeding opening is the manufacturing installation of a Plastic solid according to claim 4 by which shifts to a hoop direction of the above-mentioned rotating drum, and two or more arrangement is carried out.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the manufacturing installation and the manufacture method of a Plastic solid that fiber and the particulate matter which were dispersed can be accumulated in detail about the manufacture method of a Plastic solid, and a manufacturing installation, and a Plastic solid can be manufactured continuously and efficiently.

[0002]

[Description of the Prior Art] As equipment which manufactures the textiles of absorptivity continuously, to JP,6-142,B It has the rotating drum which has two or more crevices for accumulation in a peripheral face, and a feeding means to disperse raw material fiber in the peripheral face of this rotating drum, and to supply it to it. The supplied raw material fiber is made to attract and deposit in each crevice for accumulation of the above-mentioned rotating drum. The manufacturing installation of textiles which manufactures a Plastic solid continuously by making the sediment of this raw material fiber release from mold from this each crevice for accumulation is indicated, and according to this equipment The raw material fiber supplied by dispersing is deposited in each crevice for accumulation, size enlargement of it is carried out and mold release blowdown is carried out on a conveyor from the inside of this crevice for accumulation as a Plastic solid.

[0003]

[Problem(s) to be Solved by the Invention] However, in the conventional manufacturing installation mentioned above, since the whole base of the crevice for accumulation was attracted, only the absorber which has uniform **** structure in the whole was able to be manufactured.

[0004] Therefore, the object of this invention accumulates dispersed raw materials, such as fiber and a particulate matter, and is to offer the manufacture method and manufacturing installation which can manufacture continuously and efficiently the absorber suitable for health articles, such as an absorber of the manufacture method and manufacturing installation which can manufacture a Plastic solid continuously and efficiently, and the structure where contents, such as **** structure and absorption polymer, differ selectively further especially a disposable diaper, and a sanitary napkin.

[0005]

[Means for Solving the Problem] In a method of manufacturing a Plastic solid by this invention's dispersing a raw material, supplying it, making this raw material attracting and depositing on a crevice for accumulation, and making a sediment of this raw material releasing from mold from this crevice for accumulation The above-mentioned object is attained by dividing the above-mentioned crevice for accumulation into two or more unit accumulation sections which can be attracted mutual independently, and offering a manufacture method of a Plastic solid characterized by making the above-mentioned raw material attract and deposit for this every unit accumulation section.

[0006] Moreover, a rotating drum which rotates this invention along with a peripheral face of a fixed drum on which the interior is maintained by negative pressure, and this fixed drum, and has two or more crevices for accumulation in a peripheral face, It has a feeding means to disperse a raw material in a peripheral face of this rotating drum, and to supply it to it. The supplied above-mentioned raw material is made to attract and deposit in each crevice for accumulation of the above-mentioned rotating drum. By making a sediment of this raw material release from mold from this each crevice for accumulation, it is equipment which manufactures a Plastic solid continuously, and each above-mentioned crevice for accumulation attains the above-mentioned object by offering a manufacturing installation of a Plastic solid currently divided into two or more unit accumulation sections which can be attracted mutual independently.

[0007]

[Embodiment of the Invention] Hereafter, the manufacture method of the absorber of this invention and the desirable operation gestalt (the 1st operation gestalt) of a manufacturing installation are explained with reference to a drawing.

[0008] First, the manufacturing installation of the Plastic solid of the 1st operation gestalt is explained. The fixed drum 1 on which the interior is maintained by negative pressure as the manufacturing installation of the 1st operation gestalt is shown in drawing 1 , The rotating drum 2 which rotates along with the peripheral face of this fixed drum 1, and has two or more crevices 3 for accumulation in a peripheral face, It has a feeding means 4 to disperse a raw material 5 in the peripheral face of this rotating drum 2, and to supply it to it. It is the manufacturing installation of a Plastic solid which manufactures an absorber 6 by making the supplied above-mentioned raw material 5 attract and deposit in each crevice 3 for accumulation of the above-mentioned rotating drum 2, and making the sediment of this raw material 5 release from mold from this each crevice 3 for accumulation.

[0009] And as shown in drawing 2 and drawing 3 , each crevice 3 for accumulation is divided into two or more unit accumulation sections 3a and 3b which can be attracted mutual independently. The opening of the above-mentioned feeding means 4 was carried out toward the peripheral face of a rotating drum 2, and it is equipped with the feeding openings 4a and 4b which supply the raw material 5 of an absorber 6 on this peripheral face. As shown in drawing 1 , the feeding openings 4a and 4b are

shifted to the hoop direction of the above-mentioned rotating drum 2, and are arranged in two or more places. And in case the above-mentioned rotating drum 2 rotates and each above-mentioned crevice 3 for accumulation passes through each above-mentioned feeding openingsa [4] and 4b front, it is made every feeding opening 4 as [draw / of two or more unit accumulation sections 3a and 3b / selectively / at least one]. In case attraction of only unit accumulation section 3a of the unit accumulation sections 3a and 3b is specifically performed in case each crevice 3 for accumulation passes feeding opening 4a, and each crevice 3 for accumulation passes feeding opening 4b, it is made as [perform / attraction of only unit accumulation section 3b of the unit accumulation sections 3a and 3b].

[0010] As shown in drawing 2 -4, two or more attraction openings 21a and 21b corresponding to each unit accumulation sections 3a and 3b are formed in the inner skin of a rotating drum 2. Each of each attraction openings 21a and 21b is shifted and formed crosswise [of a rotating drum 2]. That is, attraction opening 21a and attraction opening 21b are alternate. The inhalation openings 12a and 12b corresponding to [on the other hand] each feeding openings 4a and 4b in the peripheral face of the fixed drum 1, Namely, inhalation opening 12a which a opening is carried out [a] in the direction of feeding opening 4a, and carries out the attraction deposition of the raw material supplied from this feeding opening 4a into each crevice 3 for accumulation, A opening is carried out in the direction of feeding opening 4b, and inhalation opening 12b which carries out the attraction deposition of the raw material supplied from this feeding opening 4b into each crevice 3 for accumulation is prepared. and in case each crevice 3 for accumulation passes through a feeding opening 4a front Attraction opening 21a of the above-mentioned rotating drum 2 and inhalation opening 12a of the fixed drum 1 lap. In case unit accumulation section 3a opened for free passage by this inhalation opening 12a in each crevice 3 for accumulation is attracted selectively and each crevice 3 for accumulation passes through a feeding opening 4b front Attraction opening 21b of a rotating drum 2 and inhalation opening 12b of the fixed drum 1 lap, and it is made as [attract / unit accumulation section 3b opened for free passage by this inhalation opening 12b in each crevice 3 for accumulation / selectively].

[0011] As the fixed drum 1 is shown in drawing 4 , in preparation for a peripheral face, it becomes the main part 10 of a fixed drum, and this main part 10 of a fixed drum from the tubed ring 13 by which outside attachment immobilization was carried out about the mesh section 11, and the above-mentioned inhalation openings 12a and 12b are formed in the circumferential wall surface of this tubed ring 13.

[0012] Free passage connection of the exhaust pipe 14 which leads to a dust collection fan (not shown) as shown in drawing. 1 is made at the side flat-surface section of the fixed drum 1, and the inside of the main part 10 of a fixed drum is maintained by negative pressure with the exhaust air from an exhaust pipe 14. The tubed ring 13 is the member of the thin meat by which outside attachment immobilization is carried out at this main part 10 of a fixed drum, and the above-

mentioned inhalation openings 12a and 12b are formed in the circumferential wall surface.

[0013] Since it is considering as the configuration which does not form the direct inhalation opening 12 in the peripheral face of the main part 10 of a fixed drum, but forms the inhalation opening 12 in the tubed ring 13 according to the manufacturing installation of the Plastic solid of this operation gestalt, there is an advantage that a **** pattern can be changed easily, without needing exchange of the main part 10 of a fixed drum to which has weight and the exhaust pipe 14 grade was connected.

[0014] The rotating drum 2 is made as [rotate / to the clockwise rotation shown by the drawing 1 Nakaya mark A along with the peripheral face of the fixed drum 1], the crevice 3 for accumulation of the abbreviation mold for T characters as shown in drawing 2 and drawing 3 sets a predetermined gap, and two or more formation is carried out at the peripheral face. Each crevice 3 for accumulation is formed by forming opening of the abbreviation mold for T characters in the pattern ring 23 which constitutes the outermost layer of drum of a rotating drum 2, as shown in drawing 4, and the base is constituted by the mesh 31. The attraction in each crevice 3 for accumulation is made through a mesh 31, and the raw material 5 of an absorber will accumulate on this mesh 31.

[0015] The feeding means 4 is equipped with two feeding pipes 40a and 40b, and each head opening is the feeding openings 4a and 4b. the above-mentioned feeding pipes 40a and 40b — the feeding device (not shown) which the raw material 5 of absorbers, such as grinding pulp and water absorption polymer, is dispersed, and is supplied is prepared in each upstream, and it is made as [supply / from each feeding openings 4a and 4b / the raw material with which configuration raw materials differ from those presentations].

[0016] Attraction installation is carried out by operation of the negative pressure in the above-mentioned fixed drum 1 into each crevice 3 for accumulation, and the raw material 5 of the absorber supplied from the feeding openings 4a and 4b is deposited on the above-mentioned mesh 31 in this crevice 3 for accumulation.

[0017] And the sediment deposited in each crevice 3 for accumulation is transported to the delivery section B, while adsorption maintenance had been carried out by it into each crevice 3 for accumulation, as shown in drawing 1. The compulsive extrusion means (not shown) and the vacuum conveyor 7 by the compressed air are arranged in the above-mentioned delivery section B, and while the above-mentioned sediment is released from mold in this delivery section B, it is won popularity and passed on the pasteboard 8 conveyed as an absorber 6 in the left lateral in drawing 1. In addition, the dust collection pipe for attracting and removing the absorber formation raw material which remains in the crevice 3 for accumulation after mold release is shown by nine in drawing 1, further, the diffuser of the compressed air is formed on the peripheral face corresponding to this dust collection pipe 9 of the above-mentioned fixed drum 1, and it makes the more positive thing clearance of this absorber formation raw material.

[0018] Next, the desirable 1st operation gestalt of the manufacture method of the absorber using the manufacturing installation of a Plastic solid which has the above-mentioned configuration, i.e., the manufacture method of the Plastic solid of this invention, is explained. The manufacture method of the Plastic solid of this operation gestalt disperses a raw material 5, supply it, and this raw material 5 is made to attract and deposit on each crevice 3 for accumulation. It is the manufacture method of a Plastic solid of manufacturing a Plastic solid by making the sediment of this raw material 5 releasing from mold from this crevice 3 for accumulation. Each above-mentioned crevice 3 for accumulation is divided into two or more unit accumulation sections 3a and 3b which can be attracted mutual independently, and a raw material (a raw material which is [presentation / a class, an amount, or] different preferably) is made to attract and deposit on every this unit accumulation section 3a and 3b.

[0019] Hereafter, the manufacture method of the Plastic solid of the 1st operation gestalt is explained to details. First, the clockwise rotation of the arrow head A in drawing 1 is made to rotate a rotating drum 2 with constant speed. The dust collection fan (not shown) connected to the other end of an exhaust pipe 14 is operated simultaneously, the inside of the main part 10 of a fixed drum is held to negative pressure, and the interior of the feeding pipes 40a and 40b is made to produce the airstream to the fixed direction. The negative pressure level at this time is a degree which produces the airstream which can convey the grinding pulp and water absorption polymer which are the raw material of an absorber, and is suitably adjusted according to the amount of supply of a raw material.

[0020] Next, water absorption polymer is continuously supplied to supply in the feeding pipe 40 of the grinding pulp from a feeding device, and abbreviation coincidence. The grinding pulp and water absorption polymer which joined within feeding pipe 40a and 40b are supplied to a rotating drum 2 as interflow mixed by homogeneity. In addition, the absorber formation raw material supplied from feeding pipe 40a was made into what has the high ratio of absorption polymer, and the absorber formation raw material supplied from feeding pipe 40b was made into what has the low ratio of absorption polymer.

[0021] the time of a rotating drum 2 rotating and each crevice 3 for accumulation passing the above-mentioned feeding opening 4a — the attraction openings 21a and 21a of the above-mentioned rotating drum 2 — the inhalation openings 12a and 12a of the fixed .. and above-mentioned drum 1 — only unit accumulation section 3a of the unit accumulation sections [in / in .. / overlap and each crevice 3 for accumulation] 3a and 3b is attracted selectively. Consequently, an absorber formation raw material with the high ratio of absorption polymer accumulates on unit accumulation section 3a. furthermore, the time of a rotating drum 2 rotating and the crevice 3 for accumulation passing the above-mentioned feeding opening 4b — the attraction openings 21b and 21b of a rotating drum 2 — the inhalation openings 12b and 12b of the .. and fixed drum 1 — only unit accumulation section 3b of the unit

accumulation sections [in / in .. / overlap and this crevice 3 for accumulation] 3a and 3b is attracted selectively. Consequently, an absorber formation raw material with the low ratio of absorption polymer accumulates on unit accumulation section 3b. Thus, an absorber formation raw material with a high polymer ratio accumulates on unit accumulation section 3a in each crevice 3 for accumulation, and an absorber formation raw material with a low polymer ratio accumulates on unit accumulation section 3b in each crevice 3 for accumulation. And the absorber with which absorption polymer contents differ selectively is obtained by making the sediment in each crevice 3 for accumulation release from mold. Furthermore, the absorber of such structure can be continuously manufactured efficiently by continuing a revolution of a rotating drum 2.

[0022] According to the manufacturing installation of the Plastic solid of the 1st operation gestalt, since it comes to have the above-mentioned configuration, the absorber with which the contents of absorption polymer differ selectively can be manufactured efficiently. Furthermore, various absorbers of the structure where **** structure differs from the content of absorption polymer etc. selectively can be continuously manufactured efficiently by changing suitably the combination of the absorber formation raw material supplied from the above-mentioned feeding openings 4a and 4b. Moreover, since the distance between the pars-basilaris-ossis-occipitalis mesh section 31 of the crevice 3 for accumulation and the attraction opening 21 can be designed very narrowly, the miniaturization of equipment is possible and improvement in operability can be aimed at. Furthermore, since the configuration of the space which opens the mesh section 31 and the attraction opening 21 of a pars basilaris ossis occipitalis of the crevice 3 for accumulation for free passage has the shape of a mere box, manufacture of equipment itself, especially manufacture of a rotating drum are easy.

[0023] As mentioned above, although 1 desirable operation gestalt of this invention was explained, this invention can be changed suitably. For example, although the configuration of the crevice 3 for accumulation in the 1st operation gestalt is the abbreviation mold for T characters, it is made to a proper configuration according to the configuration of the Plastic solid made into the object etc. Moreover, it can be decided about the crevice 3 for accumulation that they will be freedom, such as the number of division, a configuration of division, and a class of divided absorber formation raw material of each portion.

[0024] moreover, the 1st operation gestalt — setting — each unit accumulation sections 3a and 3b of the crevice 3 for accumulation — although the inhalation opening 12 with which it is alike, respectively, and it receives and two or more attraction openings 21 and the same number correspond is formed — the manufacturing installation of the Plastic solid of this invention — the unit accumulation sections 3a and 3b — it is alike, respectively, and it receives and the single attraction opening 21 and the inhalation opening 12 may be formed.

[0025] Moreover, in the manufacture method of the Plastic solid of this invention,

and a manufacturing installation, although each one unit accumulation section of every is attracted for every feeding location, the two or more [per feeding location] unit accumulation sections may be attracted simultaneously. Moreover, in the manufacturing installation of the 1st operation gestalt, although each attraction opening is a fixed suction force by applying fixed negative pressure to a fixed drum, a suction force may be changed for every unit accumulation section to each attraction opening of a fixed drum by attaching a respectively different attraction means or attaching a filter etc. in each attraction opening (or inhalation opening). The basis weight of a raw material (material) may be made to change selectively about a Plastic solid by changing a suction force for every unit accumulation section. Moreover, the basis weight which adjusts and attracts the time amount of attraction may be changed by changing the length of the hoop direction of each inhalation opening of the fixed drum corresponding to each attraction opening. Furthermore, the raw material with which a class and an amount differ from a presentation for every unit accumulation section is made to deposit by various kinds of methods, and the Plastic solid with which the presentations of a configuration raw material, basis weight, and a configuration raw material etc. differ for every portion may be manufactured.

[0026] Other operation gestalten (the 2nd operation gestalt) of this invention are explained with reference to a drawing. In addition, about especially the point of not explaining, it is the same in the 1st operation gestalt. Each crevice 3 for accumulation in the manufacturing installation of the 2nd operation gestalt is divided into the three unit accumulation sections 3c, 3d, and 3e which can be attracted mutual independently as shown in drawing 7 . and it is shown in drawing 7 and 8 — as — each unit accumulation sections 3c, 3d, and 3e — it is alike, respectively, and receives, the single attraction openings 21c, 21d, and 21e are formed, and each unit accumulation sections 3c, 3d, and 3e and the corresponding attraction openings 21c, 21d, and 21e are opened for free passage by the communicating tubes 22c, 22d, and 22e, respectively. Each of the attraction openings 21c, 21d, and 21e is formed in the location shifted crosswise [of a rotating drum 2] mutually.

[0027] Arrangement of inhalation opening in the 2nd operation gestalt was shown in drawing 8 . Drawing 8 is what developed and showed some tubed rings, and a drawing upside is the hand of cut of a rotating drum 2. In the manufacturing installation of the Plastic solid of this operation gestalt, feeding opening is prepared in four places and each field A-D in drawing 8 shows the field located each feeding opening [4a-4d] ahead. On the other hand, Ld, Le, and Lc show the lane through which the above-mentioned attraction openings 21d, 21e, and 21c pass, respectively.

[0028] If the rotating drum 2 in the 2nd operation gestalt is rotated, it will move toward an upside in the crevice 3 for accumulation formed in the peripheral face from the bottom in drawing 8 . Attraction opening corresponding to them is formed in Field A to all the above-mentioned attraction openings 21c, 21d, and 21e, and in case the crevice 3 for accumulation passes through Field A, the negative pressure in

the fixed drum 1 acts on all of the unit accumulation sections 3c, 3d, and 3e. Consequently, the whole surface in the crevice 3 for accumulation is attracted, and the absorber formation raw material supplied from feeding opening 4a all over the inside of this crevice 3 for accumulation accumulates. Only inhalation opening 12c corresponding to attraction opening 21c is formed in Field B. Therefore, in case the crevice 3 for accumulation passes through Field B, only the above-mentioned unit accumulation section 3c opened for free passage by attraction opening 21c is attracted selectively. Consequently, the laminating deposition of the absorber formation raw material supplied from above-mentioned feeding opening 4b is carried out only at the above-mentioned unit accumulation section 3c. Only 12d of inhalation openings corresponding to 21d of attraction openings is formed in Field C. Therefore, in case the crevice 3 for accumulation passes through Field C, only the 3d of the above-mentioned unit accumulation sections which are open for free passage to 21d of attraction openings is attracted selectively. Therefore, the laminating deposition of the absorber formation raw material supplied from above-mentioned feeding opening 4c is carried out only at the 3d of the above-mentioned unit accumulation sections. Attraction opening is formed in Field D to all the attraction openings 21c, 21d, and 21e like Field A. Therefore, in case the crevice 3 for accumulation passes through Field D, the absorber formation raw material supplied from 4d of feeding openings all over the inside of this crevice 3 for accumulation accumulates.

[0029] Thus, passage of field A-D of one crevice 3 for accumulation obtains the layered product which has a laminated structure as shown in drawing 9 in this crevice 3 for accumulation. And the absorber which has the above-mentioned laminated structure is obtained by releasing this sediment from mold from the above-mentioned crevice 3 for accumulation. According to the manufacture method of the Plastic solid of the 2nd operation gestalt, and the manufacturing installation, the absorber which has **** structure as shown in drawing 9 can be manufactured efficiently continuously. The absorber formation raw material supplied from the above-mentioned feeding opening 4 in the 2nd operation gestalt may have the same absorber formation raw material which may be the thing of a class which is different for every feeding opening, respectively, and is supplied from two or more feeding openings. Moreover, by suspending supply of the raw material from the 4d of the above-mentioned feeding openings, and, for example, operating a manufacturing installation, the absorber which does not have the maximum upper layer D in drawing 9 can be manufactured, or the conventional absorber which consists of a layer A from which the configuration raw material is distributed over homogeneity over the whole can also be manufactured by stopping and operating the supply from the feeding openings 4b-4d. The absorber which similarly suspends the supply from feeding opening 4b or 4c, and does not have A and B can also be manufactured.

[0030] As mentioned above, although explained focusing on two operation gestalten of this invention, still more various modification is possible for this invention. For

example, the feeding opening 4 makes the feeding pipe 40 share, and is made into the thing in which two or more feeding openings 4 were formed, by classifying with a diaphragm in a point. Moreover, this invention is applied to manufacture of the Plastic solid of fibrous besides an absorber, a grain, and a powdered material, and is made.

[0031]

[Effect of the Invention] According to this invention, the dispersed raw material is accumulated and the manufacture method of a Plastic solid and manufacturing installation which can manufacture continuously and efficiently the absorber suitable for health articles, such as an absorber of the manufacture method and manufacturing installation which can manufacture a Plastic solid continuously and efficiently, and the structure where contents, such as **** structure and absorption polymer, differ selectively further especially a disposable diaper, and a sanitary napkin, can be offered.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the outline cross section showing the manufacturing installation of the Plastic solid concerning the 1st operation gestalt.

[Drawing 2] Drawing 2 is the important section enlarged view showing the manufacturing installation of the Plastic solid concerning the 1st operation gestalt.

[Drawing 3] Drawing 3 is the mimetic diagram showing the physical relationship of attraction opening of a rotating drum and inhalation opening of a fixed drum in the manufacturing installation of the Plastic solid shown in drawing 1 .

[Drawing 4] Drawing 4 is X-X-ray cross section of drawing 2 .

[Drawing 5] Drawing 5 is the perspective diagram showing the important section of the manufacturing installation of the Plastic solid concerning the 2nd operation gestalt.

[Drawing 6] Drawing 6 is the cross section showing the important section of the manufacturing installation of the Plastic solid concerning the 2nd operation gestalt.

[Drawing 7] Drawing 7 is explanatory drawing showing the division mode of the crevice for accumulation in the manufacturing installation of the Plastic solid concerning the 2nd operation gestalt.

[Drawing 8] Drawing 8 is drawing showing arrangement of inhalation opening in the manufacturing installation of the Plastic solid concerning the 2nd operation gestalt.

[Drawing 9] Drawing 9 is the decomposition perspective diagram showing the **** structure of the Plastic solid (absorber) acquired by the manufacturing installation and the manufacture method concerning the 2nd operation gestalt.

[Description of Notations]

- 1 Fixed Drum
- 10 Main Part of Fixed Drum
- 11 Mesh Section
- 12, 12a, 12b .. Inhalation opening
- 13 Tubed Ring
- 14 Exhaust Pipe
- 2 Rotating Drum
- 21 Attraction Opening
- 22, 22a, 22b .. Communicating tube
- 23 Pattern Ring
- 3 Crevice for Accumulation
- 3a, 3b, 3c and the unit accumulation section
- 31 Mesh
- 4 Feeding Opening
- 40 Feeding Pipe
- 5 Raw Material of Plastic Solid (Absorber)
- 6 Plastic Solid (Absorber)
- 7 Vacuum Conveyor

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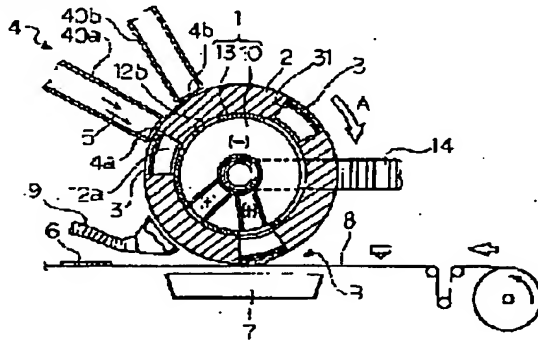
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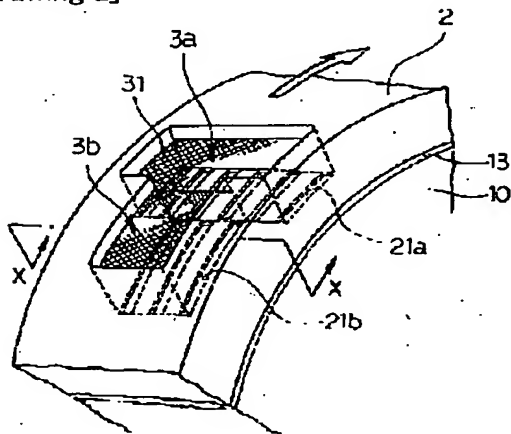
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DRAWINGS

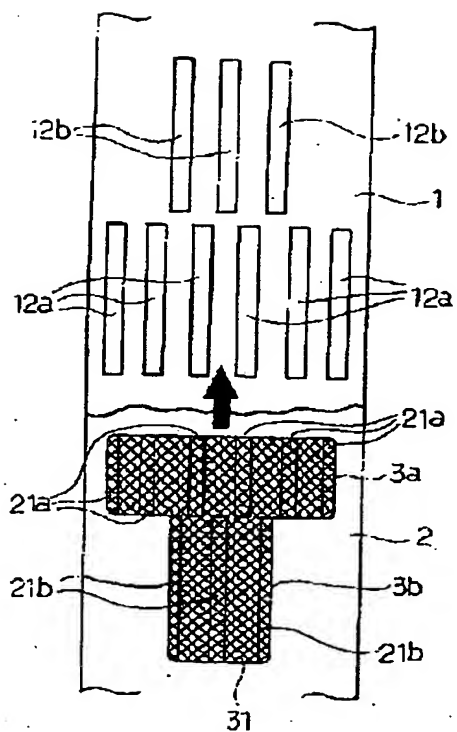
[Drawing 1]



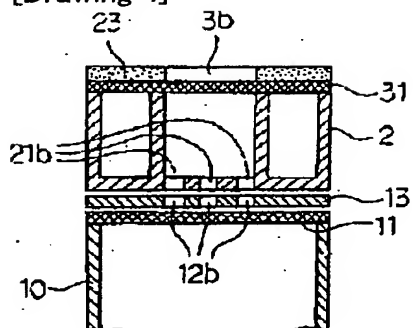
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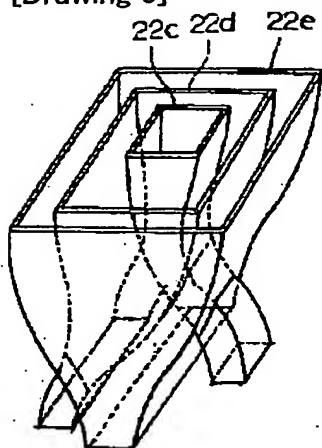
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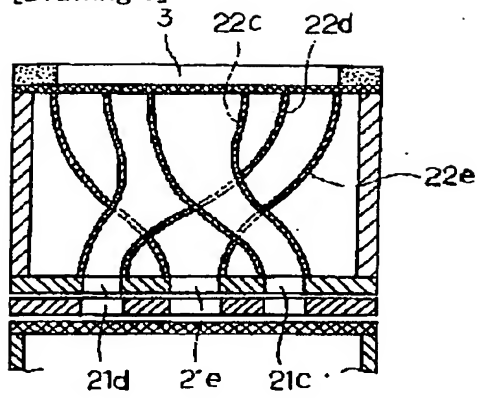
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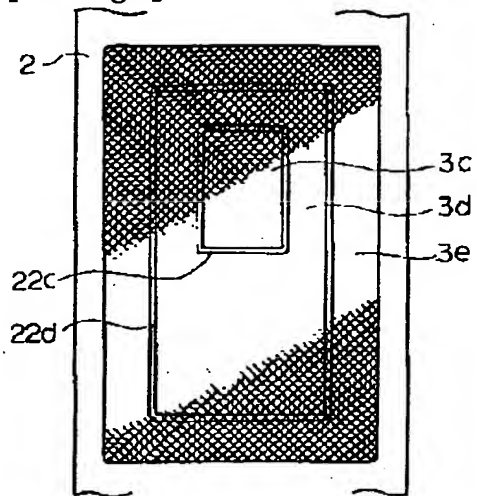
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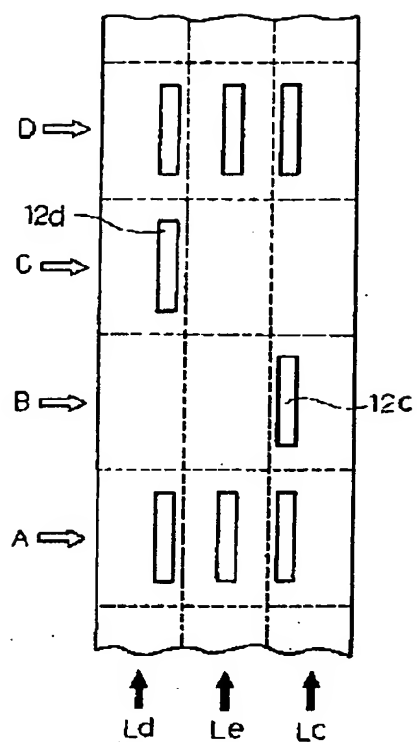
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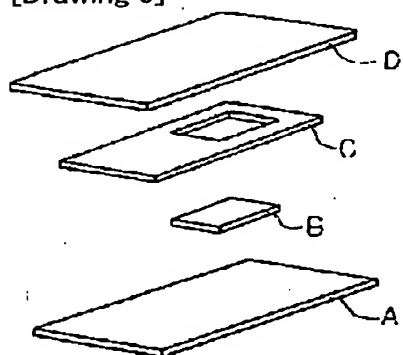
[Drawing 7]



[Drawing 8]



[Drawing 9]



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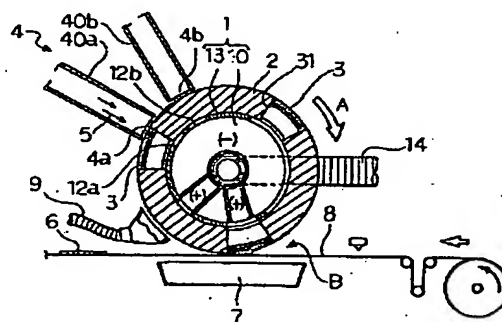
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(54) 【発明の名称】 成形体の製造方法及び製造装置

(57) 【要約】

【課題】 飛散させた原料を集積して、成形体を連続的且つ効率的に製造することができる製造方法及び製造装置、更には、積繊構造や吸収ポリマー等の含有量が部分的に異なる構造の吸収体、特に紙おむつや生理用ナプキン等の衛生品に適した吸収体を連続的且つ効率的に製造することができる成形体の製造方法及び製造装置を提供すること。

【解決手段】 原料5を飛散させて供給し、該原料5を各集積用凹部3に吸引して堆積させ、該原料5の堆積物を該集積用凹部3から離型させることにより成形体を製造する成形体の製造方法であって、上記各集積用凹部3を、互いに独立して吸引可能な複数の単位集積部に分割し、該単位集積部に上記原料5を吸引して堆積させる。



【特許請求の範囲】

【請求項1】 原料を飛散させて供給し、該原料を集積用凹部に吸引して堆積させ、該原料の堆積物を該集積用凹部から離型させることにより成形体を製造する方法において、

上記集積用凹部を、互いに独立して吸引可能な複数の単位集積部に分割し、該単位集積部毎に上記原料を吸引して堆積させることを特徴とする成形体の製造方法。

【請求項2】 上記各単位集積部毎に、種類、量又は組成の異なる原料を堆積させる請求項1記載の成形体の製造方法。

【請求項3】 内部が負圧に維持される固定ドラムと、該固定ドラムの外周面に沿って回転し、外周面に複数の集積用凹部を有する回転ドラムと、該回転ドラムの外周面に原料を飛散させて供給する原料供給手段とを備え、供給された上記原料を上記回転ドラムの各集積用凹部に吸引して堆積させ、該原料の堆積物を該各集積用凹部から離型させることにより成形体を連続的に製造する装置であって、

上記各集積用凹部が、互いに独立して吸引可能な複数の単位集積部に分割されている成形体の製造装置。

【請求項4】 上記原料供給手段は、上記回転ドラムの外周面に向かって開口する原料供給口を備え、上記回転ドラムの内周面に、上記各単位集積部に対応する吸引口が設けられ、上記固定ドラムの外周面に、上記各原料供給口に対応する吸入口が設けられており、上記回転ドラムが回転し上記各集積用凹部が上記各原料供給口の前を通過する際に、上記吸引口の内の少なくとも1つと上記固定ドラムの吸入口とが重なり、各集積用凹部における該吸入口に連通された上記単位集積部が選択的に吸引されるようになされている請求項3に記載の成形体の製造装置。

【請求項5】 上記原料供給口は、上記回転ドラムの周方向にずらして複数配設されている請求項4に記載の成形体の製造装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、成形体の製造方法及び製造装置に関し、詳しくは、飛散させた繊維や粉粒体を集積して成形体を連続的且つ効率的に製造することができる成形体の製造装置及び製造方法に関する。

【0002】

【従来の技術】吸収性の繊維製品を連続的に製造する装置として、特公平6-142号公報には、外周面に複数の集積用凹部を有する回転ドラムと、該回転ドラムの外周面に原料繊維を飛散させて供給する原料供給手段とを備え、供給された原料繊維を上記回転ドラムの各集積用凹部内に吸引して堆積させ、該原料繊維の堆積物を該各集積用凹部から離型させることにより成形体を連続的に製造する繊維製品の製造装置が開示されており、この装

置によれば、飛散されて供給された原料繊維は、各集積用凹部内に堆積して賦形され、成形体として該集積用凹部内からコンベア上に離型排出される。

【0003】

【発明が解決しようとする課題】しかしながら、上述した従来の製造装置においては、集積用凹部の底面全体が吸引されるようになっているため、全体に均一な積繊構造を有する吸収体しか製造することができなかった。

【0004】従って、本発明の目的は、飛散させた繊維や粉粒体等の原料を集積して、成形体を連続的且つ効率的に製造することができる製造方法及び製造装置、更には、積繊構造や吸収ポリマー等の含有量が部分的に異なる構造の吸収体、特に紙おむつや生理用ナプキン等の衛生品に適した吸収体を連続的且つ効率的に製造することができる製造方法及び製造装置を提供することにある。

【0005】

【課題を解決するための手段】本発明は、原料を飛散させて供給し、該原料を集積用凹部に吸引して堆積させ、該原料の堆積物を該集積用凹部から離型させることにより成形体を製造する方法において、上記集積用凹部を、互いに独立して吸引可能な複数の単位集積部に分割し、該単位集積部毎に上記原料を吸引して堆積させることを特徴とする成形体の製造方法を提供することにより、上記の目的を達成したものである。

【0006】また、本発明は、内部が負圧に維持される固定ドラムと、該固定ドラムの外周面に沿って回転し、外周面に複数の集積用凹部を有する回転ドラムと、該回転ドラムの外周面に原料を飛散させて供給する原料供給手段とを備え、供給された上記原料を上記回転ドラムの各集積用凹部内に吸引して堆積させ、該原料の堆積物を該各集積用凹部から離型させることにより成形体を連続的に製造する装置であって、上記各集積用凹部が、互いに独立して吸引可能な複数の単位集積部に分割されている成形体の製造装置を提供することにより、上記の目的を達成したものである。

【0007】

【発明の実施の形態】以下、本発明の吸収体の製造方法及び製造装置の好ましい実施形態（第1実施形態）について図面を参照して説明する。

【0008】先ず、第1実施形態の成形体の製造装置について説明する。第1実施形態の製造装置は、図1に示されるように、内部が負圧に維持される固定ドラム1と、該固定ドラム1の外周面に沿って回転し、外周面に複数の集積用凹部3を有する回転ドラム2と、該回転ドラム2の外周面に原料5を飛散させて供給する原料供給手段4とを備え、供給された上記原料5を上記回転ドラム2の各集積用凹部3内に吸引して堆積させ、該原料5の堆積物を該各集積用凹部3から離型させることにより吸収体6を製造する成形体の製造装置である。

【0009】そして、図2及び図3に示されるように、

各集積用凹部3は、互いに独立して吸引可能な複数の単位集積部3a、3bに分割されている。上記原料供給手段4は、回転ドラム2の外周面に向かって開口し、該外周面上に吸収体6の原料5を供給する原料供給口4a、4bを備えている。原料供給口4a、4bは、図1に示されるように、上記回転ドラム2の周方向にずらして複数箇所に配設されている。そして、上記回転ドラム2が回転し、上記各集積用凹部3が上記各原料供給口4a、4bの前を通過する際に、各原料供給口4毎に、複数の単位集積部3a、3bの内の少なくとも一つが選択的に吸引されるようになされている。具体的には、各集積用凹部3が、原料供給口4aを通過する際に、単位集積部3a、3bの内の単位集積部3aのみの吸引が行われ、各集積用凹部3が原料供給口4bを通過する際には、単位集積部3a、3bの内の単位集積部3bのみの吸引が行われるようになされている。

【0010】回転ドラム2の内周面には、図2～4に示されるように、各単位集積部3a、3bに対応する複数の吸引口21a及び21bが設けられている。各吸引口21a及び21bのそれぞれは、回転ドラム2の幅方向にずらして形成されている。即ち、吸引口21aと吸引口21bは、互い違いになっている。一方、固定ドラム1の外周面には、各原料供給口4a、4bに対応する吸入口12a、12b、即ち、原料供給口4a方向に開口し、該原料供給口4aから供給された原料を各集積用凹部3内に吸引堆積させる吸入口12aと、原料供給口4b方向に開口し、該原料供給口4bから供給された原料を各集積用凹部3内に吸引堆積させる吸入口12bとが設けられている。そして、各集積用凹部3が原料供給口4aの前を通過する際には、上記回転ドラム2の吸引口21aと固定ドラム1の吸入口12aとが重なり、各集積用凹部3における該吸入口12aに連通された単位集積部3aが選択的に吸引され、各集積用凹部3が原料供給口4bの前を通過する際には、回転ドラム2の吸引口21bと固定ドラム1の吸入口12bとが重なり、各集積用凹部3における該吸入口12bに連通された単位集積部3bが選択的に吸引されるようになされている。

【0011】固定ドラム1は、図4に示されるように、外周面にメッシュ部11を備えて固定ドラム本体10と、該固定ドラム本体10に外嵌固定された筒状リング13とからなり、該筒状リング13の周壁面に上記吸入口12a、12bが形成されている。

【0012】固定ドラム1の側面平面部には、図1に示すように、集塵ファン（図示せず）に通じる排気管14が連通接続されており、排気管14からの排気により固定ドラム本体10内に負圧に維持されるようになっている。筒状リング13は、該固定ドラム本体10に外嵌固定される薄肉の部材であり、その周壁面に上記吸入口12a、12bが設けられている。

【0013】本実施形態の成形体の製造装置によれば、

固定ドラム本体10の外周面に直接吸入口12を形成せず、筒状リング13に吸入口12を形成する構成としているため、重量があり且つ排気管14等が接続された固定ドラム本体10の交換を必要とせず積載パターンを容易に変更することができるという利点がある。

【0014】回転ドラム2は、固定ドラム1の外周面に沿って図1中矢印Aで示す時計方向に回転するようになされており、その外周面には、図2及び図3に示されるような略T字型の集積用凹部3が所定の間隔をおいて複数形成されている。各集積用凹部3は、図4に示すように、回転ドラム2の最外層を構成するパターンリング23に略T字型の開口部を形成することにより形成され、その底面はメッシュ31により構成されている。メッシュ31を介して各集積用凹部3内の吸引がなされ、該メッシュ31上に吸収体の原料5が堆積することになる。

【0015】原料供給手段4は、2本の原料供給管40a、40bを備えており、それぞれの先端開口部が原料供給口4a、4bである。上記原料供給管40a、40bそれぞれの上流には、粉碎バルブや吸水ポリマー等の吸収体の原料5を飛散させて供給する原料供給機構（図示せず）が設けられており、各原料供給口4a、4bから、構成原料又はそれらの組成が異なる原料を供給し得るようになされている。

【0016】原料供給口4a、4bから供給される吸収体の原料5は、上記固定ドラム1内の負圧の作用により各集積用凹部3内に吸引導入され、該集積用凹部3内の上記メッシュ31上に堆積するようになっている。

【0017】そして、各集積用凹部3内に堆積した堆積物は、図1に示されるように、各集積用凹部3内に吸着保持されたまま受け渡し部Bまで移送される。上記受け渡し部Bには、圧縮空気による強制押出手段（図示せず）及びバキュームコンベア7が配設されており、該受け渡し部Bにおいて上記堆積物は離型されると共に、吸収体6として図1中左側方向に搬送される台紙8上に受け渡される。尚、図1中9で示されるのは、離型後に集積用凹部3内に残る吸収体形成原料を吸引して除去するための集塵管であり、更に、上記固定ドラム1の該集塵管9に対応する外周面上には圧縮空気の吹き出し口が形成されており、該吸収体形成原料の除去をより確実なものとしている。

【0018】次に、上記構成を有する成形体の製造装置を用いた吸収体の製造方法、即ち本発明の成形体の製造方法の好ましい第1実施形態について説明する。本実施形態の成形体の製造方法は、原料5を飛散させて供給し、該原料5を各集積用凹部3に吸引して堆積させ、該原料5の堆積物を該集積用凹部3から離型させることにより成形体を製造する成形体の製造方法であって、上記各集積用凹部3を、互いに独立して吸引可能な複数の単位集積部3a、3bに分割し、該単位集積部3a、3b毎に、原料（好ましくは、種類、量又は組成等の異なる

原料)を吸引して堆積させる。

【0019】以下、第1実施形態の成形体の製造方法について詳細に説明する。まず、回転ドラム2を図1における矢印Aの時針方向に一定速度で回転させる。同時に、排気管14の他端に接続された集塵ファン(図示せず)を作動させ、固定ドラム本体10内を負圧に保持し、原料供給管40a、40bの内部に一定方向への空気流を生じさせる。この時の負圧レベルは、吸収体の原料である粉碎バルブ及び吸水ポリマーを搬送可能な空気流を生じさせる程度であり、原料の供給量に応じて適宜調節する。

【0020】次に、原料供給機構からの粉碎バルブの原料供給管40への供給と略同時に、吸水ポリマーを連続的に投入する。原料供給管40a、40b内で合流した粉碎バルブ及び吸水ポリマーは均一に混合された混合流として、回転ドラム2に供給される。尚、原料供給管40aから供給する吸収体形成原料は吸収ポリマーの比率の高いものとし、原料供給管40bから供給する吸収体形成原料は吸収ポリマーの比率の低いものとした。

【0021】回転ドラム2が回転して各集積用凹部3が上記原料供給口4aを通過する際、上記回転ドラム2の吸引口21a、21a・・・と上記固定ドラム1の吸入口12a、12a・・・とが重なり合い、各集積用凹部3における単位集積部3a、3bの内の単位集積部3aのみが選択的に吸引される。その結果、単位集積部3aには、吸収ポリマーの比率が高い吸収体形成原料が堆積する。更に、回転ドラム2が回転して集積用凹部3が上記原料供給口4bを通過する際、回転ドラム2の吸引口21b、21b・・・と固定ドラム1の吸入口12b、12b・・・とが重なり合い、該集積用凹部3における単位集積部3a、3bの内の単位集積部3bのみが選択的に吸引される。その結果、単位集積部3bには、吸収ポリマーの比率が低い吸収体形成原料が堆積する。このようにして、各集積用凹部3における単位集積部3aにはポリマー比率が高い吸収体形成原料が堆積し、各集積用凹部3における単位集積部3bにはポリマー比率が低い吸収体形成原料が堆積する。そして、各集積用凹部3内の堆積物を離型させることにより、吸収ポリマー含有量が部分的に異なる吸収体が得られる。更に、回転ドラム2の回転を継続することにより、このような構造の吸収体を連続的に効率よく製造できる。

【0022】第1実施形態の成形体の製造装置によれば、上記構成を有してなるので、吸収ポリマーの含有量が部分的に異なる吸収体を効率よく製造できる。更に、上記原料供給口4a、4bから供給する吸収体形成原料の組合せを適宜に変更することにより、積層構造や吸収ポリマーの含有量等が部分的に異なる構造の様々な吸収体を連続的に効率よく製造できる。また、集積用凹部3の底部メッシュ部31と吸引口21との間の距離を極めて狭く設計できるので、装置の小型化が可能であり、操

作性の向上を図れる。更に、集積用凹部3の底部のメッシュ部31と吸引口21とを連通する空間の形状が単なるボックス状であるため、装置自体の製造、特に回転ドラムの製造が容易である。

【0023】以上、本発明の好ましい一実施形態について説明したが、本発明は、適宜変更可能である。例えば、第1実施形態における集積用凹部3の形状は略T字型であるが、目的とする成形体の形状等に応じて適宜の形状にできる。また、集積用凹部3について、分割の数、分割の形状、また、分割した各部分の吸収体形成原料の種類等自由に決定できる。

【0024】また、第1実施形態においては、集積用凹部3の各単位集積部3a、3bそれぞれに対し、複数の吸引口21及び同数の対応する吸入口12が形成されているが、本発明の成形体の製造装置は、単位集積部3a、3bそれぞれに対し単一の吸引口21及び吸入口12が形成されたものであっても良い。

【0025】また、本発明の成形体の製造方法及び製造装置においては、各原料供給位置毎に各単位集積部が一つずつ吸引されるものでも良いが、各原料供給位置毎に二以上の単位集積部が同時に吸引されるものであっても良い。また、第1実施形態の製造装置においては、固定ドラムに一定の負圧をかけることにより、各吸引口は一定の吸引力であるが、固定ドラムの各吸引口に対して、それぞれ別の吸引手段を取り付けたり、各吸引口(又は吸入口)にフィルター等を取り付けることにより、単位集積部毎に吸引力を異ならせるとも良い。単位集積部毎に吸引力を異ならせることにより成形体について部分的に原料(材料)の坪量を変更させても良い。また、各吸引口に対応する固定ドラムの各吸入口の周方向の長さを変更することにより、吸引の時間を調整し吸引する坪量を変更しても良い。更に、各種の方法により、各単位集積部毎に種類、量又は組成の異なる原料を堆積させ、部分毎に構成原料、坪量、構成原料の組成等が異なる成形体を製造しても良い。

【0026】本発明の他の実施形態(第2実施形態)について図面を参照して説明する。尚、特に説明しない点については、第1実施形態におけるのと同様である。第2実施形態の製造装置における各集積用凹部3は、図7に示すように、互いに独立して吸引可能な3つの単位集積部3c、3d、3eに分割されている。そして、図7及び8に示すように、各単位集積部3c、3d、3eそれぞれに対し、単一の吸引口21c、21d、21eが形成され、各単位集積部3c、3d、3eと、対応する吸引口21c、21d、21eとはそれぞれ連通管22c、22d、22eにより連通されている。吸引口21c、21d、21eのそれぞれは、互いに回転ドラム2の幅方向にずらした位置に形成されている。

【0027】第2実施形態における吸入口の配置を図8に示した。図8は、筒状リングの一部を展開して示した

もので、図の上側が回転ドラム2の回転方向である。本実施形態の成形体の製造装置においては、原料供給口が4カ所に設けられており、図8における各領域A～Dは、それぞれの原料供給口4a～4dの前方に位置する領域を示している。一方、Ld、Le、Lcは、それぞれ上記吸引口21d、21e、21cが通過するレーンを示している。

【0028】第2実施形態における回転ドラム2を回転させると、その外周面に形成された集積用凹部3は、図8における下側から上側に向かって移動する。領域Aには、上記吸引口21c、21d、21eのすべてに対し、それらに対応する吸引口が形成されており、集積用凹部3が領域Aを通過する際には、単位集積部3c、3d、3eのいずれにも固定ドラム1内の負圧が作用する。その結果、集積用凹部3内の全面が吸引され、該集積用凹部3内全面に原料供給口4aから供給された吸収体形成原料が堆積する。領域Bには、吸引口21cに対応する吸入口12cのみが形成されている。従って、集積用凹部3が領域Bを通過する際には、吸引口21cに連通された上記単位集積部3cのみが選択的に吸引される。その結果、上記原料供給口4bから供給される吸収体形成原料は上記単位集積部3cのみに積層堆積される。領域Cには、吸引口21dに対応する吸入口12dのみが形成されている。従って、集積用凹部3が領域Cを通過する際には、吸引口21dに連通する上記単位集積部3dのみが選択的に吸引される。従って、上記原料供給口4cから供給される吸収体形成原料は上記単位集積部3dのみに積層堆積される。領域Dには、領域Aと同様に吸引口21c、21d、21eのすべてに対し吸引口が形成されている。従って、集積用凹部3が領域Dを通過する際には、該集積用凹部3内全面に原料供給口4dから供給された吸収体形成原料が堆積する。

【0029】このようにして、一つの集積用凹部3が領域A～Dを通過すると、図9に示すような積層構造を有する積層体が該集積用凹部3内に得られる。そして、該堆積物を上記集積用凹部3から離型することにより、上記積層構造を有する吸収体を得られる。第2実施形態の成形体の製造方法及び製造装置によると、図9に示されるような積層構造を有する吸収体を連続的に効率よく製造することができる。第2実施形態における上記原料供給口4から供給する吸収体形成原料は、原料供給口毎にそれぞれ異なる種類のものであっても良いし、2以上の原料供給口から供給される吸収体形成原料が同一であっても良い。また、例えば、上記原料供給口4dからの原料の供給を停止して製造装置を動作させることにより、図9における最上層Dを有しない吸収体を製造したり、原料供給口4b～4dからの供給を停止して動作させることにより、全体に渡って構成原料が均一に分布している層Aのみからなる従来の吸収体を製造したりすることもできる。同様に、原料供給口4b又は4cからの供給

を停止してA及びBを有しない吸収体を製造することもできる。

【0030】以上、本発明の2つの実施形態を中心に説明したが、本発明は更に様々な変更が可能である。例えば、原料供給口4は、原料供給管40を共有させ、先端部において仕切り板で分けすることにより複数の原料供給口4を形成したものにもできる。また、本発明は、吸収体の他、繊維状、粒状、粉状物の成形体の製造に適用することができる。

【0031】

【発明の効果】本発明によれば、飛散させた原料を集積して、成形体を連続的且つ効率的に製造することができる製造方法及び製造装置、更には、積層構造や吸収ポリマー等の含有量が部分的に異なる構造の吸収体、特に紙おむつや生理用ナプキン等の衛生品に適した吸収体を連続的且つ効率的に製造することができる成形体の製造方法及び製造装置を提供できる。

【図面の簡単な説明】

【図1】図1は、第1実施形態に係る成形体の製造装置を示す概略断面図である。

【図2】図2は、第1実施形態に係る成形体の製造装置を示す要部拡大図である。

【図3】図3は、図1に示す成形体の製造装置における回転ドラムの吸引口と固定ドラムの吸入口との位置関係を示す模式図である。

【図4】図4は、図2のX-X線断面図である。

【図5】図5は、第2実施形態に係る成形体の製造装置の要部を示す斜視図である。

【図6】図6は、第2実施形態に係る成形体の製造装置の要部を示す断面図である。

【図7】図7は、第2実施形態に係る成形体の製造装置における集積用凹部の分割態様を示す説明図である。

【図8】図8は、第2実施形態に係る成形体の製造装置における吸入口の配置を示す図である。

【図9】図9は、第2実施形態に係る製造装置及び製造方法により得られる成形体（吸収体）の積層構造を示す分解斜視図である。

【符号の説明】

- 1 固定ドラム
- 10 固定ドラム本体
- 11 メッシュ部
- 12, 12a, 12b・・・吸入口
- 13 筒状リング
- 14 排気管
- 2 回転ドラム
- 21 吸引口
- 22, 22a, 22b・・・連通管
- 23 バターンリング
- 3 集積用凹部
- 3a, 3b, 3c・・・単位集積部

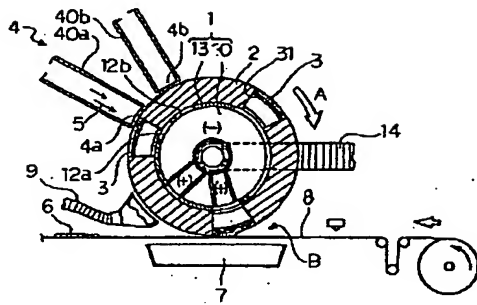
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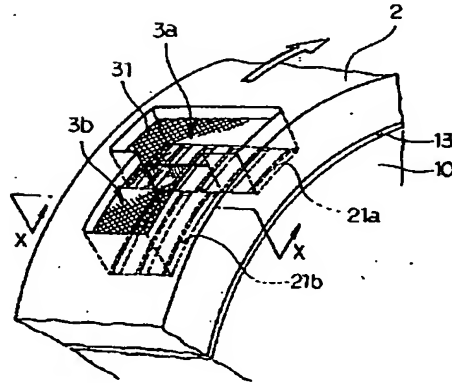
- 31 メッシュ
4 原料供給口
40 原料供給管

- 10
* 5 成形体(吸収体)の原料
6 成形体(吸収体)
* 7 バキュームコンベア

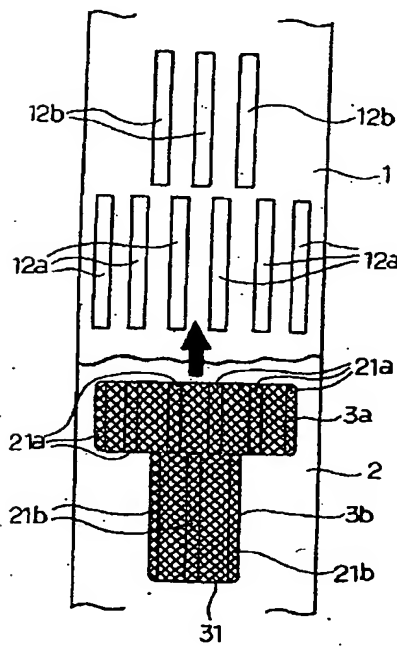
【図1】



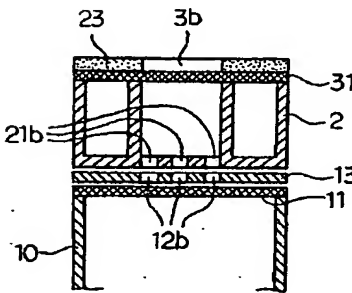
【図2】



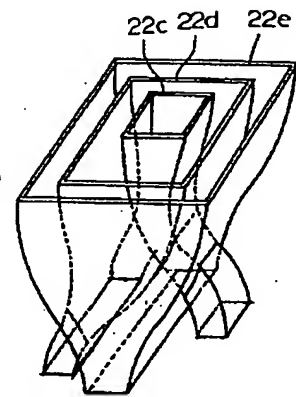
【図3】



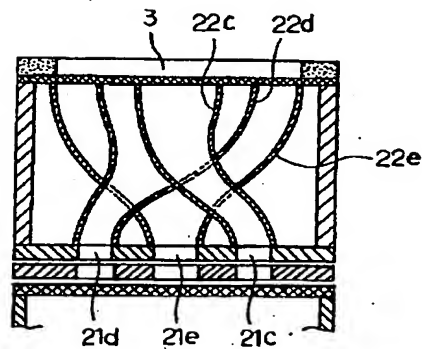
【図4】



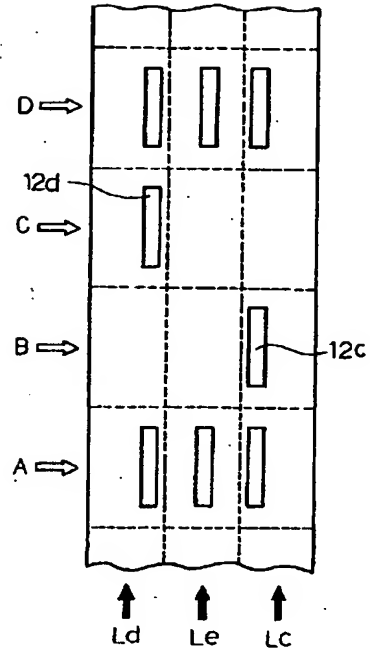
【図5】



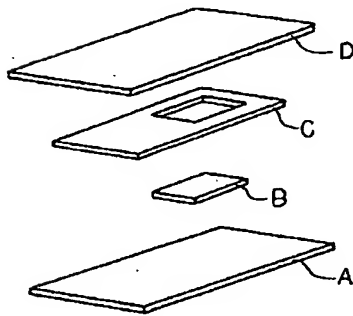
【図6】



【圖8】



【図9】



Fターム(参考) 3B029 BA01 BA05 BA11
4C003 GA02 GA05
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4L047 AB02 BD01 CC03 EA01